

What is claimed is:

1. A method for inhibiting a Th2 cytokine and/or inducing a Th1 cytokine, comprising administering to a subject in need thereof an effective amount of a CpG oligodeoxynucleotide represented by the following formula:

[formula] SYYSSACGTTSNYRAWMYTC (SEQ ID NO. 1)

wherein, S is G or C; Y is C or T; N is any one selected from the group consisting of A, G, T and C; R is G or A; W is A or T; and M is A or C, and wherein the CpG oligodeoxynucleotide comprises at least two unmethylated CpG motifs.

10

2. The method according to claim 1, wherein the Th2 cytokine is IL-4 or IL-

10.

3. The method according to claim 1, wherein the Th1 cytokine is IL-12 or

15 IFN- γ .

4. The method according to claim 1, wherein the YS or YR dinucleotide in

the formula is CG.

20

5. The method according to claim 1, wherein the CpG oligodeoxynucleotide has any one nucleotide sequence selected from the group consisting of SEQ ID NOs.

2-8.

6. The method according to claim 1, wherein the CpG oligodeoxynucleotide

25 has a phosphodiester or phosphorothioate backbone.

7. A method for stimulating an immune response, comprising administering to a subject in need thereof an effective amount of a CpG oligodeoxynucleotide represented by the following formula:

[formula] SYYSSACGTTSNYRAWMYTC (SEQ ID NO. 1)

5 wherein S is G or C; Y is C or T; N is any one selected from the group consisting of A, G, T and C; R is G or A; W is A or T; and M is A or C, and wherein the CpG oligodeoxynucleotide comprises at least two unmethylated CpG motifs.

8. The method according to claim 7, wherein the YS or YR dinucleotide in
10 the formula is CG.

9. The method according to claim 7, wherein the CpG oligodeoxynucleotide has any one nucleotide sequence selected from the group consisting of SEQ ID NOs.
2-8.

15

10. The method according to claim 7, wherein the CpG oligodeoxynucleotide has a phosphodiester or phosphorothioate backbone.

11. A method for treating or preventing a skin disease, comprising
20 administering to a subject in need thereof an effective amount of a CpG oligodeoxynucleotide represented by the following formula:

[formula] SYYSSACGTTSNYRAWMYTC (SEQ ID NO. 1)

wherein S is G or C; Y is C or T; N is any one selected from the group consisting of A, G, T and C; R is G or A; W is A or T; and M is A or C, and wherein
25 the CpG oligodeoxynucleotide comprises at least two unmethylated CpG motifs.

12. The method according to claim 11, wherein the YS or YR dinucleotide in the above formula is CG.

13. The method according to claim 11, wherein the CpG oligodeoxynucleotide has any one nucleotide sequence selected from the group consisting of SEQ ID NOs. 2-8.

14. The method according to claim 11, wherein the CpG oligodeoxynucleotide has a phosphodiester or phosphorothioate backbone.

10

15. The method according to claim 11, wherein the skin disease is selected from the group consisting of atopic dermatitis, allergic skin disease, viral skin disease and skin cancer.

16. A composition for treating or preventing a skin disease, comprising a CpG oligodeoxynucleotide represented by the following formula, as an active ingredient:

[formula] SYSSACGTTSNYRAWMYTC (SEQ ID NO. 1)

wherein S is G or C; Y is C or T; N is any one selected from the group consisting of A, G, T and C; R is G or A; W is A or T; and M is A or C, and wherein the CpG oligodeoxynucleotide comprises at least two unmethylated CpG motifs.

17. A composition for stimulating an immune response, comprising a CpG oligodeoxynucleotide represented by the following formula, as an active ingredient:

[formula] SYSSACGTTSNYRAWMYTC (SEQ ID NO. 1)

wherein S is G or C; Y is C or T; N is any one selected from the group

consisting of A, G, T and C; R is G or A; W is A or T; and M is A or C, and wherein the CpG oligodeoxynucleotide comprises at least two unmethylated CpG motifs.

18. Use of a CpG oligodeoxynucleotide represented by the following formula
5 for the preparation of an agent for treating or preventing a skin disease:

[formula] SYYSACGTTSNYRAWMYTC (SEQ ID NO. 1)

wherein S is G or C; Y is C or T; N is any one selected from the group consisting of A, G, T and C; R is G or A; W is A or T; and M is A or C, and wherein the CpG oligodeoxynucleotide comprises at least two unmethylated CpG motifs.

10

19. Use of a CpG oligodeoxynucleotide represented by the following formula for the preparation of an agent for stimulating an immune response:

[formula] SYYSACGTTSNYRAWMYTC (SEQ ID NO. 1)

wherein S is G or C; Y is C or T; N is any one selected from the group
15 consisting of A, G, T and C; R is G or A; W is A or T; and M is A or C, and wherein the CpG oligodeoxynucleotide comprises at least two unmethylated CpG motifs.